

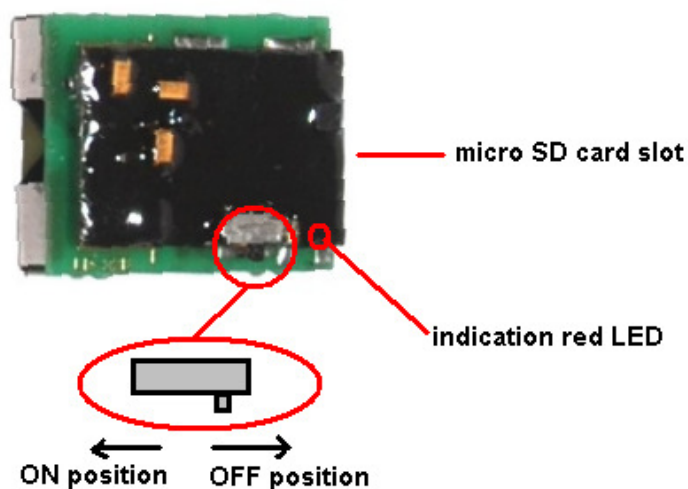
# **LR32BOX audio recorder**

User manual  
Version 1.01

This recorder let's you to record any audio or human conversation in high quality and store all on micro SDHC card. The state of art technology with very low power consumption allows you to record very long records when the battery is powering the module. This recorder is equipped with very high sensitive microphone and wide dynamic range and is able to record conversation from distance over 30 feet (10 meters). All stored recordings are accessible on micro SDHC card by using included recording manager developed for Windows operating system. This software includes fast overview of each record and simple editing functions, including search for active sound in long records. For protection of stored data it is possible to set password access for all stored recordings. Integrated real time clock should start recording in any specific period of each day or at any specific date. All recorded data are stored with time marks, which gives you very good overview in case of long time recording.

#### **Technical data:**

Dimension:	28x33x15mm
Battery types:	4x button cell 1.5V, alkaline AG-13 or Zinc Air ZA675, PR44
Power supply voltage:	3,0-6,0V
Maximum recording time:	528 hours (22 days) at 16kHz (with 16GB card)
Card type:	Micro SDHC card
Signal-to-noise ratio:	65dB
Sample rate:	22kHz, 16kHz, 11kHz, 8kHz, 5.5kHz
Bit width:	16bit
Built-in microphone sensitivity:	10-15m
Battery life in stand-by mode:	90 days (with alkaline batteries)
Voice activated recording	yes
AGC function	user selectable automatic gain control or fixed microphone gain
Exporting format:	by using included software, WAV format
Scheduled recording:	selectable daily period, week period or calendar
Operating mode select:	slide switch
Microphone type:	high quality Knowles EK23 series



Battery life in recording mode for Zinc-Air battery type measured in hours:

Sample rate	Operating time in hours
5,5kHz	330
8kHz	330
11 kHz	300
16kHz	300
22kHz	260

Battery life in recording mode for alkaline battery type measured in hours:

Sample rate	Operating time in hours
5,5kHz	150
8kHz	110
11 kHz	95
16kHz	80
22kHz	65

For extending battery life should be used voice acitivated recording mode. This option may extend this time significantly.

## Operating instructions

For controlling all functions is used one slide switch and multifunctional LED.

Before inserting batteries you must have ready formatted SDHC card, which must be formatted by included recording manager. **Card must be formatted with FAT32 filesystem only and can't contain any other files or folders, than image files, created by recording manager and can't be used by other equipment, like PDA, digital camera, etc...** After insertion of card to PC, you need to start formatting by selection in menu „Memory -> Create new image“. You should select option to create smaller image file, than the size of the card, however, the total recording time will be shorter. Creating of image file should take several minutes. After the creating of image files is complete, you will find one file with name „rcimage.raw“ which is used for storing all records. If you want to make a backup of all stored records, you should copy this file to your local hard drive. In case of selecting larger used space for image file, there will be more than one file created and the others will be named „rcimage.ra1“, „rcimage.ra2“, etc... Once you have created image file, you can insert the card into the recorder and start using it. Do not remove or insert the card, when the recording is in progress.

## Start and stop the recording

This action is operated by using a slide switch. The slide switch works in parallel with the internal timers for scheduled recording. For example, when the slide switch is in ON position, the recording is not interrupted regardless the settings of scheduled recording. When the timer activates the recording, it still continues until the scheduler reaches the scheduled stop time regardless the position of slide switch.

Before the recording starts, the LED flashing sequence will follow. When the LED flashes 5 times, it means some failure of the micro SD card and the recording didn't start. When it flashes only ones, the card is full and recording can't be started. Flashing 2 to 4 times indicates available memory space. (4 flashes – more than 75% space available, 3 flashes – more than 50% space available, 2 flashes – less than 25% space available). The recorder should store up to 255 records. If this count has exceeded, the card is considered as full. When the recording is in progress, the LED makes short flashes each 2 seconds. This function should be disabled for discrete recording. When the voice activated recording is enabled, the LED flashes only, when the sound level is above selected threshold and recording is in progress. The recording is stopped when the card is full or by moving the slide switch to OFF position. Stop sequence is indicated by 3 LED flashes.

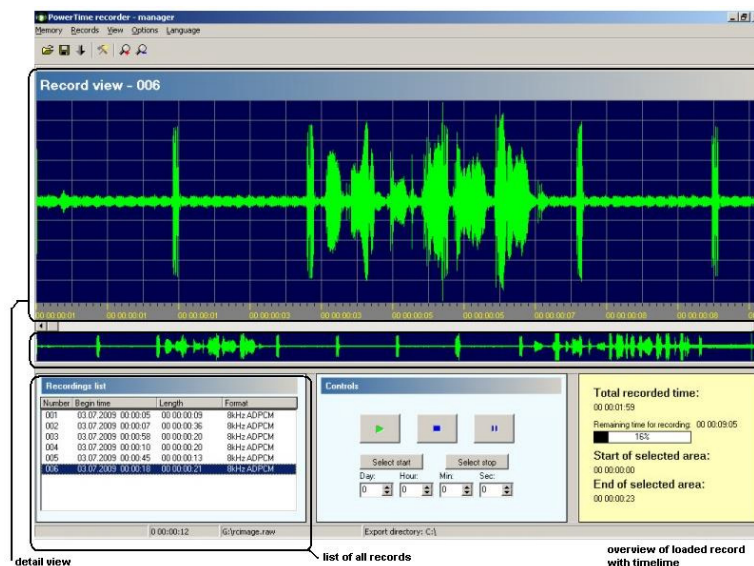
## Power supply for recorder

The recorder should be powered by small coin cell batteries with any chemistry (Zinc-Air batteries gives the longest recording time in comparing the smallest size). When Zinc-Air batteries are used, the sticker must be removed first. Keep in mind that this type of battery has a self-discharge effect. When the sticker is removed, the batteries are discharging regardless if the battery is inserted in the recorder or not. The usual usage limit is about 2-3 weeks after removing the sticker.

## Types of supported SDHC cards

The recorder supports a wide range of micro SDHC cards, however we recommend you to use our included card for best performance. The cards from the other brands should consume more power and this should affect the power consumption significantly in recording mode.

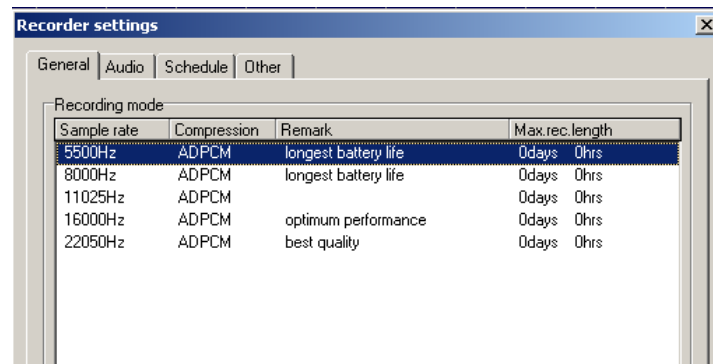
## Recorder manager – software description



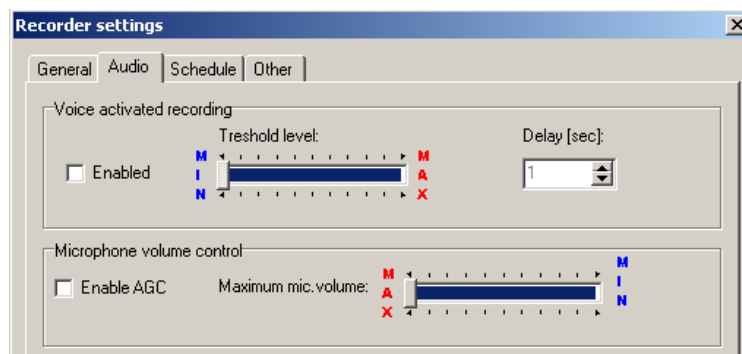
This software is used for overview, export and replay of all stored data. When you start this application you must open the image file, which is stored on microSD card, containing file „rcimage.raw“. When this action is complete, all records will be visible in recordings list. To load each record, double click on selected record you wish to load. For using the detailed view you should select only specific area by using mouse left and right button and clicking on full record's overview window. When the mouse is moved over this area, the time is visible in bottom status bar. This time scale should be non-linear, when the voice activated recording was used.

## Recorder's settings

All configuration is stored in image file on microSD card. The configuration should be changed in main menu by selecting „Options -> Recorder settings“. This windows is divided into 4 following sections:

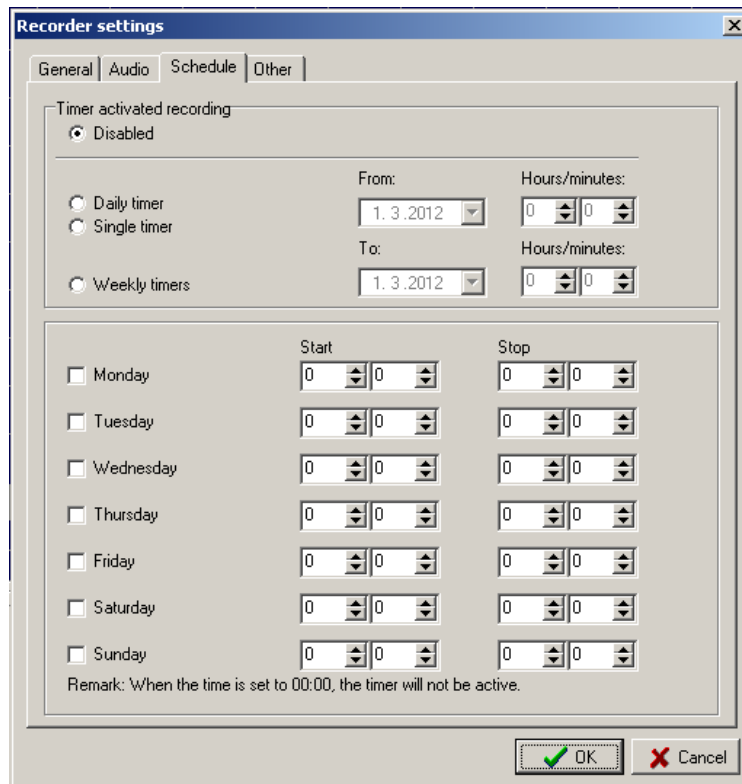


The first general part is used to select recording sample rate. To achieve the best quality you should use 16kHz or 22kHz, but this mode takes more power from the battery and will use most of the space for storing the data. For best performance check table showing battery life and memory capacity for each specific mode.



Next page is used for voice activated recording. When this option is enabled, recorder is recording only when it detects sound above selected threshold level. Minimum level means the highest sensitivity. Delay is specifying the time, for how long recording continues after this sound level is not detected anymore. Recommended value is 5 seconds or more. When LED is enabled to flash during recording, it is flashing only when recording is in progress and not when the recorder is in idle mode waiting for exceeding the selected threshold level. This mode saves significantly the battery energy resulting much longer time of operation. For microphone volume control is implemented AGC function. The recorder should be used in noisy environment or to monitor large rooms, where all silent sounds are required to be recorded. When AGC checkbox is checked, this function is enabled and recorder automatically adjust microphone volume according detected sound level. Maximum

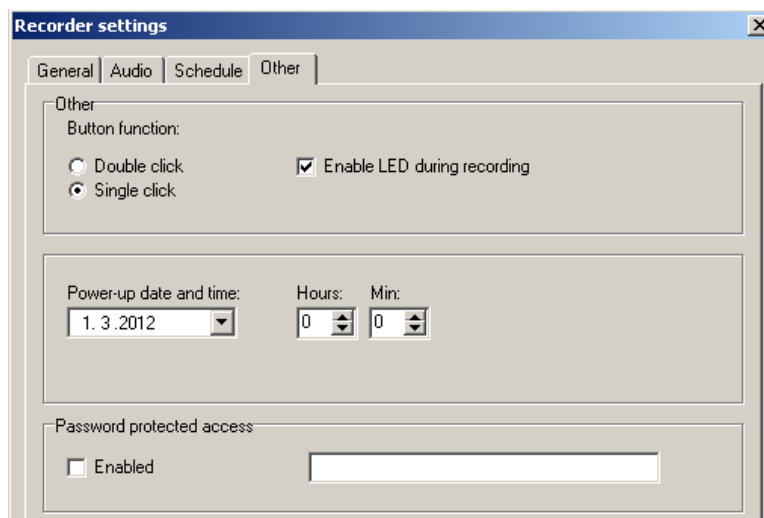
microphone volume indicates the maximum volume used by AGC function. When AGC function is disabled, this selected volume is fixed for all the time.



The image shows the 'Recorder settings' dialog box with the 'Schedule' tab selected. The 'Timer activated recording' section has 'Disabled' selected. Below this, there are three options: 'Daily timer', 'Single timer', and 'Weekly timers'. The 'From' and 'To' date pickers are both set to '1. 3. 2012'. The 'Hours/minutes' pickers for both 'From' and 'To' are set to '0' for hours and '0' for minutes. Below these, there is a table for weekly timers with columns for 'Start' and 'Stop' times for each day of the week. All days are currently unchecked, and all time pickers are set to '0'. A remark at the bottom states: 'Remark: When the time is set to 00:00, the timer will not be active.' At the bottom right, there are 'OK' and 'Cancel' buttons.

	Start	Stop
<input type="checkbox"/> Monday	0 : 0	0 : 0
<input type="checkbox"/> Tuesday	0 : 0	0 : 0
<input type="checkbox"/> Wednesday	0 : 0	0 : 0
<input type="checkbox"/> Thursday	0 : 0	0 : 0
<input type="checkbox"/> Friday	0 : 0	0 : 0
<input type="checkbox"/> Saturday	0 : 0	0 : 0
<input type="checkbox"/> Sunday	0 : 0	0 : 0

Recorder is equipped with internal real time clock and recording scheduler. If you want to use time activated recording, you can choose from 3 options. Daily timer enables recording scheduler to start and stop recording at the specified time period, which repeats every day. Single timer is used to start and stop only once at given time and date. The last is weekly timer, where you can specify a different time periods for each day of a week. Every time set to 00:00 is ignored, which enables to schedule recording for example over the midnight.



The image shows the 'Recorder settings' dialog box with the 'Other' tab selected. The 'Button function' section has 'Single click' selected, and the 'Enable LED during recording' checkbox is checked. The 'Power-up date and time' section has a date picker set to '1. 3. 2012' and time pickers for 'Hours' and 'Min' both set to '0'. The 'Password protected access' section has an 'Enabled' checkbox that is unchecked, followed by an empty text input field.

The last part of a configuration contains various options. LED should be disabled in this window to allow discrete mode of operation. Only flashes during recording are disabled. Indication of power up, start and stop sequence is not affected by this option. The real time clock is synchronized according the preset time stored on micro SD card. When you select in this window power-up date and time, this date and time is synchronized inside the recorder when the card is inserted into a recorder and the recorder is powered up by inserting the batteries. All recordings should be password protected by using password protection.

### **Password protection**

When the password protection is enabled and the password is entered, all recorded audio will be protected by using this password. When you open the image file, you'll have to type correct password to open all audio records.

### **Export of records**

Each record should be exported and stored to your local hard drive in WAV format. To do this, select from one exporting options in main menu „Records“. All records are stored to selected directory, which you can change by menu item „Select directory for export“. Long records should be split into more files. Use option in menu “Records->Maximum size of exported file” to specify maximum size of each exported WAV file.

### **FAQ:**

Q: Can't start recording – LED flashes only once and the card is not full.

A: The card contains 255 records. For next recording you must delete at least last record from the list or format the card.

Q: Card can't be initialized, LED always flashes 5 times.

A: Card is not micro SDHC type or is not properly inserted or the power supply can't give sufficient current to initialize the card.

Q: The beginning time of recording is incorrect.

A: This time is always equivalent to the real time clock, which are synchronized from the card. This problem should happen, when the batteries were removed or the card was removed and clocks are resynchronized again with wrong time.

Q: Recorder was operating and the power source has been suddenly interrupted.

A: For this case the last record will be stored properly without any problems.

Q: The image file is missing on the card, or the card is unreadable in PC computer or the image file was deleted.

A: In this case never try to recover the data by using any data recovery software and consult this problem with your distributor of recorder. All the data should be recovered, but recorder is using specific way to store the data and special procedure must be used for this case.

Q: The program shows much shorter available space for recording, then is the expected size of used card.



A: The card was formatted to smaller image size. You must create new image file with using maximum space of card.

Q: Recorded sound is distorted in very loud sequences.

A: Enable AGC function in recorder's settings to prevent microphone overloading by loud sounds. Avoid using ADPCM2 compression, if you require good quality of audio.